



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/090,489	03/04/2002	Ranjit S. Oberoi	5681-14000	5065

7590 09/20/2005  
Jeffrey C. Hood  
MEYERTONS, HOOD, KIVLIN, KOWERT & GOETZEL  
P.O. Box 398  
Austin, TX 78767

EXAMINER

WOODS, ERIC V

ART UNIT PAPER NUMBER

2672

DATE MAILED: 09/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/090,489

Applicant(s)

OBEROI ET AL.

Examiner

Eric V. Woods

Art Unit

2672

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 25 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 7-10, 17-22 and 25-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7-10, 17-22 and 25-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

By

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments, see Remarks pages 1-4, filed 25 May 2005, with respect to various rejections have been fully considered and are persuasive.

The objection to claim 21 stands withdrawn since applicant amended the claim to correct the dependency issues.

The rejections applied to claims 13-14 and 23-24 have been withdrawn because applicant canceled these claims.

The rejection of claims 7-10 and 17-22 under 35 U.S.C. 103(a) stands withdrawn in view of applicant's amendments.

New grounds of rejection follow below for claims 7-10, 17-22, and newly added claims 25-33, and are necessitated by applicant's amendments.

Examiner notes that the changes and additions to each claim changes claim scope sufficiently to require a new search, thusly allowing any new combinations of references to be used. As such, the finality of this Office Action is proper.

Applicant argues in Remarks page 2 that Haeberli does not specify that the weights be specified on a per-pixel basis and that Haeberli teaches away from this particular limitation.

First of all, the fact that the weight used in Haeberli can be positive or negative does **not** teach away from using alpha as a weight. To the contrary, it simply means that the system of Haeberli has the flexibility to utilize other weighting schemes.

Haeberli does however specify that each pixel possesses an alpha value, which clearly

Art Unit: 2672

does establish that Haeberli provides a per-pixel weight (namely, alpha) that could be utilized for such purposes.

### ***Claim Objections***

Applicant is advised that should claim 28 be found allowable, claim 29 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

### ***Claim Cancellations***

Claims 1-6, 11-16, and 23-24 are cancelled by applicant, with claims 25-33 having been added by the amendment of 25 May 2005.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morein in view of Haeberli and Cesana et al (US 6,466,220 B1).

In regards to claim 7, Morein and Haeberli in combination clearly teach a method comprising: **(a) reading a first stream of image pixels corresponding to an image  $X_K$  from an image memory; (b) reading a second stream of pixels corresponding to an image  $A_K$  from an accumulation buffer; (c) blending each image pixel of the image  $X_K$  with the corresponding pixel of the image  $A_K$  based on an alpha value provided with the image pixel, and thus, generating a third stream of output pixels defining an image  $A_{K+1}$ ; and (d) transferring the third stream of output pixels to the accumulation buffer; (e) performing (a), (b), (c), and (d) for each image after the first image of a sequence of  $N$  images  $X_K$  for  $K=0, 1, 2, \dots N-1$ .**

- Morein teaches a method and apparatus for supporting accumulation buffering in a video graphics system (Col. 2, lines 3-36), which explicitly is accumulating each image in a sequence of images  $X_K$ ,  $K=0, 1, 2, \dots N-1$ . All video comprises a sequence of images.
- Morein teaches blending together pixel data from the drawing buffer (140) and the first (170) or second accumulation buffer (180) using the controller (160), which specifically is reading a first stream of image pixels and second stream of image pixels as recited in the instant claim (Col. 5, line 10 - Col. 6, line 12 and FIG. 1). Thus, said drawing buffer specifically is an image buffer. The controller reads the pixel data from the drawing buffer

and adds said pixel data to the corresponding pixel data in the accumulation buffer based on the information found in the mask buffer (150). Said mask buffer allows the accumulation process to be performed efficiently by indicating only the relevant pixel data. In addition, Morein teaches that once a predetermined number of accumulation operations have occurred for a predetermined number of images, said first accumulation buffer acts as the output buffer (Co1. 6, lines 13-25). Thus, said blended pixel data is transferred back and stored in the first accumulation buffer. Then the second accumulation buffer takes over the next predetermined set of accumulation processes. In other words, the first and second accumulation buffer takes turn accumulating pixel data for each sequence of image.

- Although Morein does not explicitly teach blending images based on alpha values, it is well known and standard in the art that blending images using accumulation buffer requires alpha blending. Blending a plurality of layers specifically must be performed using not only the color values but also the alpha values. Said alpha values determine the weight given to each image in the set of images being blended together.
- A buffer is clearly a type of memory by definition. While the terms are not absolutely interchangeable, a buffer is a type of memory. The word buffer in this context can be replaced by the word memory, and such substitution **is a broadening amendment**, thus warranting the final status of this

Art Unit: 2672

Office Action. Clearly, the buffers of Morein are memories and thus teach this limitation.

- Obviously, when the system is initialized, the contents of all buffers and memories (at least image buffers and memories) will be set to null. The first image or stream would be stored in one buffer, but it would make no sense whatsoever to combine or blend it with a null or nonexistent image. Therefore, it would be obvious that only after the second image or stream had arrived that each image should be combined as set forth in the instant claim.

It is well known in the art that frame buffers typically store data in an RGBA (red, green, blue, alpha format). An analogous art, Haeberli et al. teaches that the accumulation buffer provides 16 bits to store each red, green, blue, and alpha color components (Pages 31 1, Section 3.2). Thus, by definition, blending the alpha color components of all images being blended specifically is blending based on the alpha value provided with each pixel. Haeberli is **ONLY** utilized to show that the accumulation buffer has RGB and alpha (A) channels. Note the discussion concerning the limitations of Haeberli in the Response to Arguments section above.

An analogous art, Cesana teaches that alpha blending (Abstract, 2:49-60) pixel streams is well known in the art (5:5-10) and provides benefits such as allowing the addition of multiple region (on-screen display) graphics and the like (1:10-35). Alpha blending is obvious and well known in the art, as stated in the last Office Action. Cesana is added as proof of this statement.

It would have been obvious to one of ordinary skill in the art at the time of the invention to take the teachings of Morein and to modify it by adding the method of blending each image pixel based on the alpha value of each image pixel in order to implement standard blending using the accumulation buffer. The alpha values dictate the opacity of each image pixel, which influence the weighed average of the color values for each pixel, and thus blending by alpha value is a necessary standard technique well known in the art as shown in Cesena, since this modification would allow the creation of multiple region graphics and provide many other useful capabilities to the system of Morein, which has accumulation buffers that prima facie possess alpha values on a per-pixel basis as specified in Haeberli (and accumulation buffers have been known to have alpha values on a per-pixel basis since Haeberli, well over twelve years before the filing of the instant application, and a decade before the filing of the Morein and Cesana application), since this allows the specification of quadruplet RGBA values for writing to the accumulation buffer, which is known to be more efficient, and for the reasons specified in the previous Office Action.

In reference to claim 9, Morein, Haeberli, and Cesana teach the method of claim 7 as described above. In addition, Morein and Haeberli et al. teach in combination said blending comprises blending red, green and blue components of each output pixel in parallel.

As applied to claim 7 above, all color values are blended together for each pixel (Col. 5, line 26 - Col. 6, line 25). Since Haeberli et al. teaches that accumulation buffers provides storage for RGB and alpha color values, blending color values together as



Art Unit: 2672

taught by Morein specifically is blending RGB and alpha values together. And since all color values for each pixels are blended together, said blending of RGB and alpha values must be performed in parallel.

In reference to claim 10, Morein, Haeberli, and Cesana teach the method of claim 7, but do not explicitly teach wherein (a), (b), (c), (d) and (e) are performed by a graphics hardware accelerator chip in response to software functions executed on a host processor. Although Morein and Haeberli et al. do not explicitly name a hardware accelerator, the prior art discloses the overall architecture of one embodiment where the system is implemented on a processor, a state machine, or other circuitry (Col. 5, lines 26-30 and Col. 7, lines 6-16). Said graphics system comprising an integrated circuit specifically is a hardware accelerator chip performing in response some sort of software commands to perform (a), (b), (c), (d), and (e). Also, the instruction is given via software since that is the conventional method of communication between the processor and the rest of the graphics hardware. Thus, it would have been obvious to implement the graphics system of Morein and Haeberli et al. using a hardware accelerator chip.

In regards to claim 17, the same basis and rationale for claim rejection as applied to claim 7 above. The limitations of claim 17 are identical to the limitations of claim 7, except for one added limitation directed to the mixing unit. Morein explicitly teaches a mixing unit (Col. 5, line 26 - Col. 6, line 25). Said controller (160) specifically is a mixing unit.

Art Unit: 2672

Claims 8, 18-19, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morein in view of Haeberli and Cesana, and further in view of McReynolds.

In reference to claims 8 and 18, Morein, Haeberli, and Cesana teach the method of claim 7, but does not explicitly teach the color precision of the accumulation buffer is greater than the color precision of the image buffer. It is well known and obvious, however, to implement a more precise output data calculation in order to avoid losing original data precision and minimize aliasing. An analogous art, McReynolds et al., teaches said limitations.

- McReynolds et al. teaches that 'in order to maintain accuracy over many blending operations, the accumulation buffer has a higher number of bits per color components than a typical color buffer (section 6.4, lines 3-4). Higher number of bits per color components will result in greater color precision for the accumulation buffer.

It would have been obvious to someone of ordinary skill in the art to take the teachings of Morein, Haeberli, and Cesana and to add from McReynolds, the method of providing higher color precision of the accumulation buffer than the color precision of the image buffer in order to maintain color precision accuracy over many blending operations. This prevents loss of data and alleviates aliasing problems. It is always important to maintain precise accuracy of data after any data processing.

In reference to claim 19, Morein, Haeberli, and Cesana teach the method and system of claim claims 7 and 17 above and Morein, Haeberli, and Cesana and

Art Unit: 2672

McReynolds teach the system of claims 8, 18, and 22 above. In addition, remember that Morein teaches a first and a second accumulator in order to minimize the delay between accumulation and rendering. Since each pixel provides a RGB color component and an alpha value, each of the plurality of accumulators is capable of mixing a corresponding color component. Morein also explicitly teaches that if the color data includes multiple color portions, such as red, green, and blue portions, each of these portions will be treated individually by the output block (Col. 6, lines 37-42), and thus it would have been obvious to one of ordinary skill in the art at the time of the invention to take the teachings of Morein and Haeberli and to implement a plurality of mixing units to accumulate individual color components. Since parallel processing is well known and obvious in the art, it would have been obvious to use a plurality of mixing units to comprise the controller (160) of Morein. Haeberli et al further suggests this, since an accumulator buffer comprises 16 bit to store each red, green, blue, and alpha components, it would be wise to apply a different mixer for each component in order to perform parallel processing and speed up the overall image processing.

In reference to claim 22, Morein, Haeberli, and Cesana teach the system of claim 17, and Morein, Haeberli, Cesana, and McReynolds teach the system of claim 18 above. While Morein, Haeberli, and Cesana do not explicitly teach the color precision of the accumulation buffer is at least  $\Delta N$  larger than the color precision of the image buffer, wherein  $\Delta N$  is the base two logarithm of the maximum number of images to be blended into the accumulation buffer, McReynolds et al. teaches said limitation in the following in similar fashion as applied to claims 8 and 18 above.

As applied to claims 8 and 18 above, McReynolds et al. teaches that in order to maintain accuracy over many blending operations, the accumulation buffer has a higher number of bits per color components than a typical color buffer (section 6.4, lines 3-4). Higher number of bits per color components than a typical color buffer is interpreting broadly as to include the bit range  $\Delta N$  larger than the color precision of the image buffer. The definition of  $\Delta N$ , base two log of maximum number of images to be blended into the accumulation buffer, is one of design choices resulting in the accumulation buffer having a higher number of bits per color than the image buffer.  $\Delta N$  as defined by the applicant has no clear advantage over other design choices, and the specific definition still falls under the range of bit size disclosed by McReynolds.

It would have been obvious to someone of the ordinary skill in the art to take the teachings of Morein, Haeberli, and Cesana and to take from McReynolds et al. and one of many design choices to modify the bit size of the accumulation buffer to be at least  $\Delta N$  larger than that of the image buffer, where  $\Delta N$  is defined as stated in the claim language, in order to maintain color precision accuracy over many blending operations. This is the same motivation as applied to claims 8 and 18 above.

Claims 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morein in view of Haeberli and Cesana, and further in view of McReynolds et al. as applied to claims 8, 18, and 22 above, and further in view of Murata et al.

In regards to claim 21, Morein, Haeberli, Cesana, and McReynolds et al. teach the system of claim 18 above, but do not explicitly teach wherein the image buffer

Art Unit: 2672

resides within the frame buffer of a graphic system. It is, however, well known in the art that frame buffer is a memory module storing image information to be sent to the display device (e.g. Monitor), and it is also well known and standard in the art the a memory module can comprise a plurality of separate memory units. This allows for easy transfer of data from one memory to another, especially any image data from image buffer to frame buffer for the purpose of speedy display of said image data. For example, an analogous art, Murata et al. explicitly teaches that a frame buffer comprises an image buffer and a Z buffer (Col. 1, lines 33-40, Col. 3, lines 4-37 and FIG. 1(A), 3-4). It would have been obvious to one of ordinary skill in the art at the time of the invention to take the teachings of Morein, Haeberli, Cesana, and McReynolds et al, and to add from Murata et al., the combined image and frame buffer since it is well known and obvious standard in the art. Having separate buffers in one memory (buffer) module saves space, speeds data transfer and provides overall efficient graphic system.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morein in view of Haeberli and Cesana, and further in view of McReynolds as applied to claims 8, 18, and 22 above, and further in view of Murata et al. as applied to claim 21 above, and further in view of Takeuchi.

In reference to claim 20, Morein, Haeberli, Cesana, and McReynolds teach the system of claim 18 above, but do not explicitly teach the accumulation buffer resides within a texture buffer of a graphics system. But, remember that Murata explicitly teaches that a plurality of buffers can reside in one large buffer unit. An analogous art,

Art Unit: 2672

Takeuchi, explicitly teaches one memory module comprising a plurality of buffers including an accumulation buffer (47) and a texture buffer (48) connected as one unit (FIG. 3). Since the accumulation buffer and the texture buffer are indeed connecting together in the figure, Takeuchi explicitly teaches an accumulation buffer residing within a texture buffer. In addition, in light of the well know and standard memory allocation technique as taught by Murata, it would have been obvious to one of ordinary skill in the art at the time of the invention to take the teachings of Morein, Haeberli, Cesana, and McReynolds, and to add from Murata, and Takeuchi the memory allocation technique to combine a plurality of buffers in one large memory module in order to save space and speed up data transfer as applied to claim 21 above. This effectively eliminate the need for extra individual buffers and to expand the capacities of the texture buffer since a texture buffer can include several SDRAMS capable of housing several types of buffers and memories. Further, having the accumulation buffer reside in the texture buffer will reduce interconnect lengths and thus improve speed and efficiency of the hardware accelerator.

Claim 25 is rejected under 35 U.S. C. 103(a) as obvious over Morein, Haeberli, and Cesana as applied to claim 17, and further in view of Adler et al (US 6,028,907).

As to claim 25, this is essentially the same system as that of claim 17 with additional limitations, the rejection to which is incorporated by reference. Specifically, the mixing unit of the system of claim 17 is comparable to the accumulation unit of claim 25. The limitation of processing N of the images is taught in the third clause. The "2D slice" of the instant claim is comparable to the  $X_{kth}$  image – that is, an image is

inherently 2D, and so such a slice would in fact meet that limitation. Also, the weighted value is not specified to be an alpha value, so in theory Morein alone would be sufficient to make the rejection, but the other references are included for the reasons discussed in the Response to Arguments section and the rejection to claim 17 itself.

Specifically, Adler teaches in Figure 2 that a stack of 2D slices from a CT scan (which is known in the art to be generated by incrementally moving a patient through a fixed scanning apparatus to generate a stack of sequential two-dimensional images of a 3D object) can be merged to generate a three-dimensional model of said object. Adler further marks contours on each object (as is apparent in Figure 2)(4:35-55, for example) so that a composite view of the three-dimensional object can be generated and navigated around in three-dimensional space (6:10-16).

Obviously, the system of Morein could be used to generate the resultant three-dimensional view, since Adler does not specify that much of the specific graphics subsystem used to calculate such details.

It would be obvious to one of ordinary skill in the art at the time the invention was made to combine the systems of Morein, Haeberli, and Cesana with the system of Adler so that a system that could more rapidly render three-dimensional models of bone deformation for scoliosis and the like could be generated and efficiently navigated through by a user.

As to claim 26, Haeberli and Cesana clearly teach the use of alpha values, and that each pixel has its own alpha value. It would be obvious that if images were being

Art Unit: 2672

alpha-blended, that each pixel would have its own alpha value, and alpha is inherently a transparency value.

As to claim 27, applicant is trying to claim equation that fundamentally underlies alpha blending. The following blend operation takes place for each color channel. That equation is as follows (see McReynolds page 112, section 10.2, alpha blending, as one of an infinite number of examples of this equation):

$$C_{out} = C_{src} * A_{src} + (1 - A_{src}) * C_{dst}$$

Where  $C_{out}$  is the output color to the framer buffer,  $A_{src}$  is the alpha value,  $C_{dst}$  is the destination color, and  $C_{src}$  is the source color, where source color is the color of the overall scene and the destination color is the color of the object to be added or composited with the overall scene or present image.

The following equivalencies exist between the variables of the equation of applicant and the variables stated in the alpha blending equation from McReynolds:

$A_{K+1}$  is equivalent to  $C_{out}$ , alpha is equivalent to  $A_{src}$ ,  $X_K$  is equivalent to  $C_{src}$ , and  $A_K$  is equivalent to  $C_{dst}$ . ( $A_{K+1}=C_{out}$ , alpha= $A_{src}$ ,  $X_K=C_{src}$ ,  $A_K=C_{dst}$ ). Now, applicant's equation will be factored and rearranged as below:

$$A_{K+1} = alpha * (X_K - A_K) + A_K \Rightarrow A_{K+1} = alpha * X_K + (-alpha + 1) * A_K \Rightarrow$$

$$A_{K+1} = alpha * X_K + (1 - alpha) * A_K$$

Compare to alpha blending equation as above:  $C_{out} = C_{src} * A_{src} + (1 - A_{src}) * C_{dst}$

They are exactly the same once the mappings specified above are performed.

Therefore, since the Cesana reference teaches alpha blending, it inherently teaches this limitation.



Art Unit: 2672

As to claims 28 and 29, since as applicant has pointed out in the Remarks on page 2, alpha is always a positive value, less than or equal to one (inclusive of zero), Cesana inherently teaches this limitation.

Claim 29 is a duplicate of claim 28 and rejected accordingly.

Claims 30 and 32 are rejected under 35 U.S.C. 103(a) as unpatentable over Morein, Haeberli, and Cesana as applied to claims 7 and 17, and further in view of Adler. (Claims are method and apparatus, identical limitations, thus properly rejected as above).

Morein, Haeberli, and Cesana do not teach that the 2D images are slices of a three-dimensional object.

Specifically, Adler teaches in Figure 2 that a stack of 2D slices from a CT scan (which is known in the art to be generated by incrementally moving a patient through a fixed scanning apparatus to generate a stack of sequential two-dimensional images of a 3D object) can be merged to generate a three-dimensional model of said object. Adler further marks contours on each object (as is apparent in Figure 2)(4:35-55, for example) so that a composite view of the three-dimensional object can be generated and navigated around in three-dimensional space (6:10-16).

Obviously, the system of Morein could be used to generate the resultant three-dimensional view, since Adler does not specify that much of the specific graphics subsystem used to calculate such details.

Art Unit: 2672

It would be obvious to one of ordinary skill in the art at the time the invention was made to combine the systems of Morein, Haeberli, and Cesana with the system of Adler so that a system that could more rapidly render three-dimensional models of bone deformation for scoliosis and the like could be generated and efficiently navigated through by a user.

As to claims 31 and 33, applicant is trying to claim equation that fundamentally underlies alpha blending. The following blend operation takes place for each color channel. That equation is as follows (see McReynolds page 112, section 10.2, alpha blending, as one of an infinite number of examples of this equation):

$$C_{out} = C_{src} * A_{src} + (1 - A_{src}) * C_{dst}$$

Where  $C_{out}$  is the output color to the framer buffer,  $A_{src}$  is the alpha value,  $C_{dst}$  is the destination color, and  $C_{src}$  is the source color, where source color is the color of the overall scene and the destination color is the color of the object to be added or composited with the overall scene or present image.

The following equivalencies exist between the variables of the equation of applicant and the variables stated in the alpha blending equation from McReynolds:

$A_{K+1}$  is equivalent to  $C_{out}$ , alpha is equivalent to  $A_{src}$ ,  $X_K$  is equivalent to  $C_{src}$ , and  $A_K$  is equivalent to  $C_{dst}$ . ( $A_{K+1}=C_{out}$ ,  $alpha=A_{src}$ ,  $X_K=C_{src}$ ,  $A_K=C_{dst}$ ). Now, applicant's equation will be factored and rearranged as below:

$$A_{K+1} = alpha * (X_K - A_K) + A_K \Rightarrow A_{K+1} = alpha * X_K + (-alpha + 1) * A_K \Rightarrow$$

$$A_{K+1} = alpha * X_K + (1 - alpha) * A_K$$

Compare to alpha blending equation as above:  $C_{out} = C_{src} * A_{src} + (1 - A_{src}) * C_{dst}$

Art Unit: 2672

They are exactly the same once the mappings specified above are performed.

Therefore, since the Cesana reference teaches alpha blending, it inherently teaches this limitation.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric V. Woods whose telephone number is 571-272-7775. The examiner can normally be reached on M-F 7:30-4:30 alternate Fridays off.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on 571-272-7664. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2672

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eric Woods

15 September 2005

  
JEFFREY A. BREIS  
PRIMARY EXAMINER